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AUGUST, 1921.



TRADE MARK

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697.3
AIR HEATERS & WASHERS

BLACKMAN

BLACKMAN EXPORT CO., LTD.,
AIR AND GAS ENGINEERS,

374, Euston Road, LONDON, N.W.1.

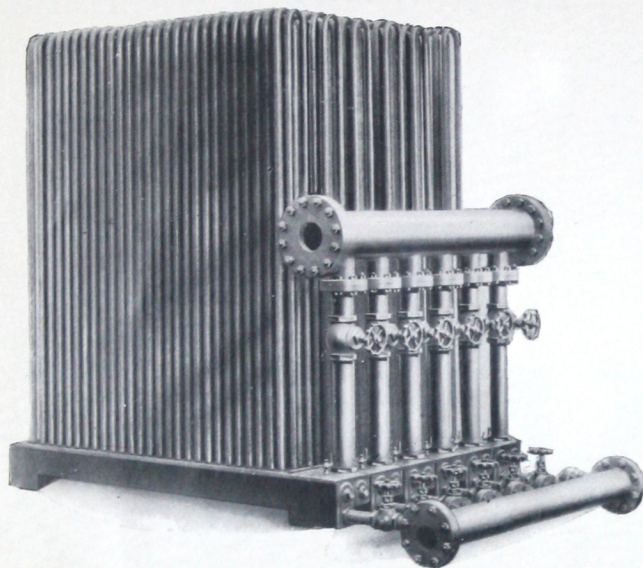
Codes { WESTERN UNION,
A.B.C., 5th & 6th Editions.
LIEBER'S.
BENTLEY'S.
PRIVATE.

Telephone No. : MUSEUM. 2845.

Cables : "ACULLA," London.
Telegrams : "ACULLA. EUSROAD," London.

BLACKMAN SOLID DRAWN JOINTLESS RETURN TUBE HEATERS.

HEATER BATTERY. FOR LIVE OR EXHAUST STEAM.



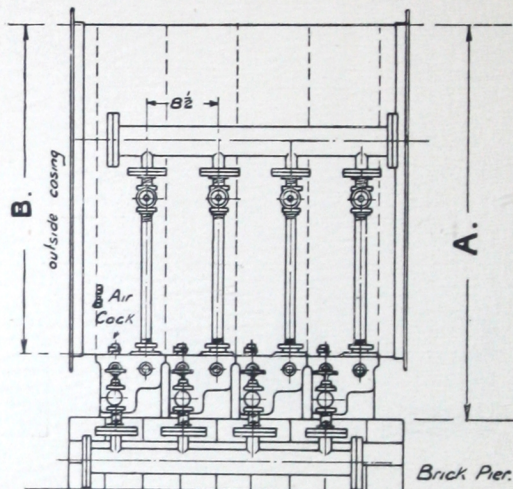
Heater Sections. Each Section is complete in itself. The double row of staggered solid drawn jointless tubing is expanded into the base which is of cast iron with two chambers.

Air resistance, about 0.12-in. water gauge per section at 1,200-ft. per minute air speed.

Heater Battery. Comprising any number of sections complete with steam and drain drums, valves, cocks, trap, and casing if desired.

The number of Sections per battery is indicated by adding the following code words to those on page 3:—
Two, Exrih; Three, Exroj; Four, Exruk; Five, Exsag; Six, Exseh; Seven, Exsij; Eight, Exsok; Nine, Exsul.

HEATER BATTERY WITH CASING.



If connection from casing to fan inlet required, add Code Word:—

Extum.

If connection from casing to fan outlet required, add Code Word:

Exuhg.

N. B.—The above only apply when a definite size of Fan is being enquired for or ordered from us.

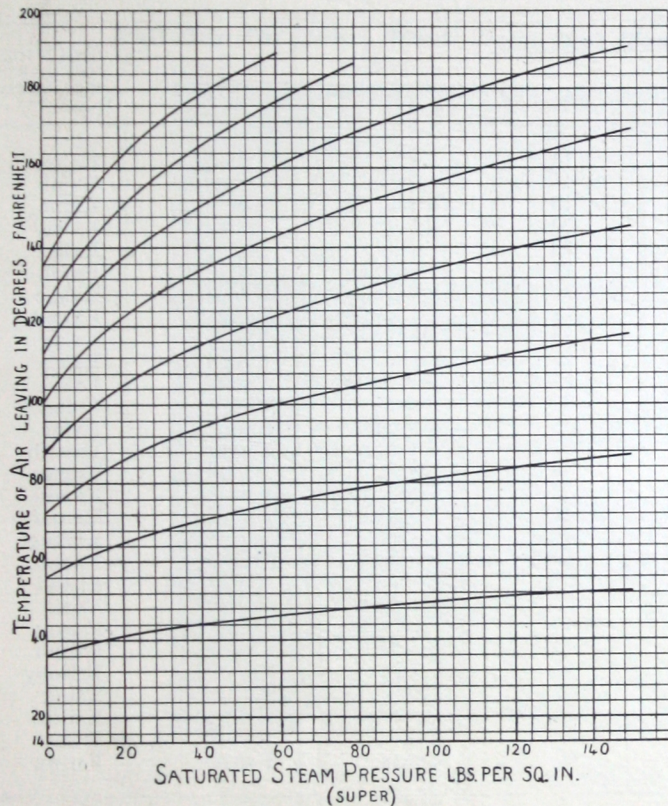
Data that should accompany all Enquiries and Orders for Heater Batteries.

Pressure of saturated steam available.

Difference of temperature in degrees Fahrenheit between the air entering and leaving the battery.

N. B.—It will be assumed that the battery has been selected from the chart on page 2.

104 90-B1193 TRF



RETURN TUBE HEATER CURVES

Maximum Steam Pressure for Standard sets is 150-lbs. per sq. in.

The distance between any two curves gives the temperature rise per section with air passing through heater at 1,200 feet per minute speed.

Example :

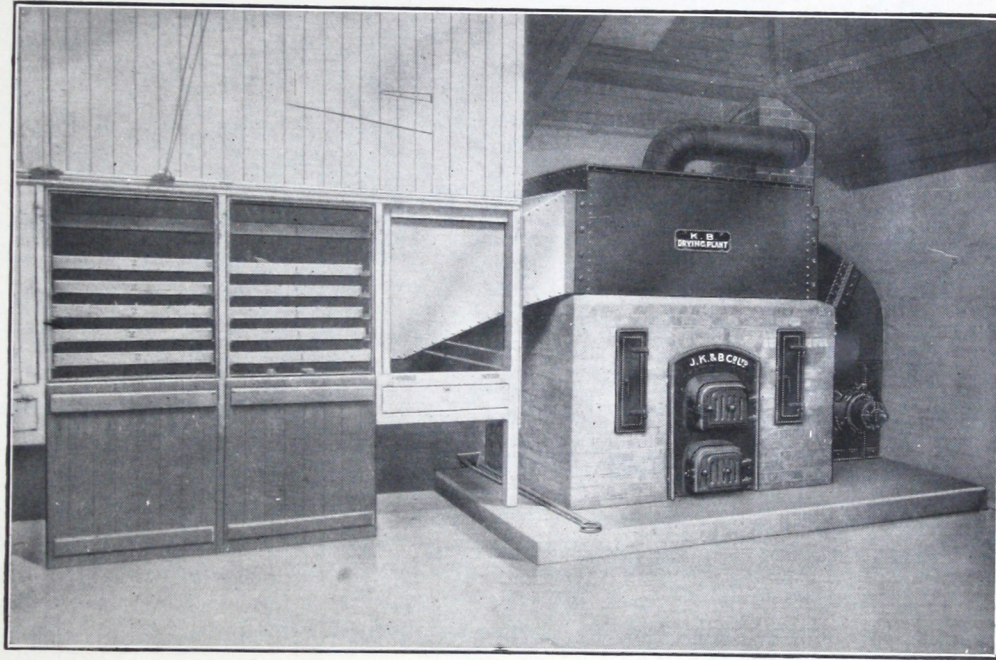
Required to heat air from 70° F. to 134° F. with steam at 40-lbs. pressure. Number of Sections is shown to be 3.

SIZES, PARTICULARS AND CODE WORDS OF RETURN TUBE HEATERS.

Nominal Size of Section.		Volume of Air based on 1200-ft. per min. air speed.	Approximate Shipping Specification per Section.			Code Word, Section only.	Code Word, for Battery.	Code Word, Battery with Casing.
Length.	Height.		Net Weight.	Gross Weight.	Cubic Feet.			
Ft. In.	Ft. In.		Lbs.	Lbs.				
3 0	3 0	4750	370	500	14	Ewtig	Exces	Exjiz
3 0	3 6	5520	436	586	16	Ewtoh	Excit	Exjob
3 0	4 0	6180	455	600	18	Ewtuj	Excov	Exjuc
3 0	4 6	7150	505	650	20.5	Ewudy	Excuw	Exkay
3 0	5 0	8100	540	675	23	Ewuhc	Exdas	Exkez
3 0	5 6	9100	590	740	25	Ewujd	Exdet	Exkib
3 0	6 0	10000	630	780	27.5	Ewulg	Exdiv	Exkoc
4 0	4 0	8500	535	640	21.5	Ewurl	Exdux	Exkud
4 0	4 6	9500	600	720	24	Ewvaf	Exedy	Exlaz
4 0	5 0	10500	700	840	27	Ewveg	Exehc	Exleb
4 0	5 6	11500	750	900	29.5	Ewvih	Exejd	Exlic
4 0	6 0	12600	810	970	32	Ewvoj	Exelg	Exlod
4 0	6 6	14000	860	1040	35	Ewvuk	Exerl	Exluf
4 0	7 0	15100	915	1100	37.5	Ewxah	Exesm	Exmab
5 0	5 0	13100	840	1010	34	Ewxik	Exewr	Exmec
5 0	5 6	14400	905	1090	37.5	Ewxum	Exeyt	Exmid
5 0	6 0	15600	975	1170	41	Ewzak	Exfat	Exmof
5 0	6 6	17000	1040	1250	44	Ewzel	Exfev	Exmug
5 0	7 0	18500	1110	1340	47.5	Ewzim	Exfox	Exnac
5 0	7 6	20000	1180	1420	51	Ewzon	Exfuy	Exned
5 0	8 0	21500	1260	1510	54	Ewzup	Exgav	Exnif
6 0	6 0	18800	1170	1400	40	Exafy	Exgew	Exnog
6 0	6 6	20300	1240	1490	43.5	Exahb	Exgix	Exnuh
6 0	7 0	21800	1320	1580	47	Exajc	Exgoy	Exnoby
6 0	7 6	23400	1400	1630	50	Exalf	Exguz	Exojg
6 0	8 0	25200	1470	1770	53.5	Exark	Exhaw	Exorn
6 0	8 6	27000	1550	1860	57	Exawp	Exhex	Exosp
6 0	9 0	28700	1640	1970	60	Exays	Exhub	Exowt

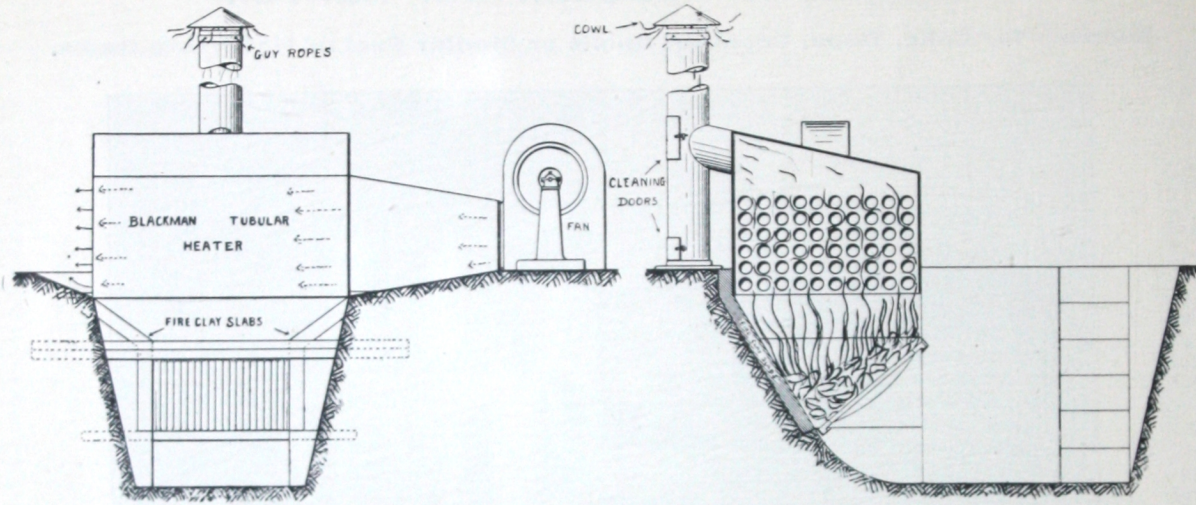
BLACKMAN TUBULAR AIR HEATER

Suitable for Coke, Wood, Coco-Nut Shells or Similar Fuel or Hot Waste Gases.



This illustrates the Heater on a brickwork furnace applied to a drying cupboard, but page 5 shows the furnace arrangement where brickwork is difficult or expensive to obtain.

Tubular Heater—continued



BLACKMAN TUBULAR HEATER

The Heater is shown supported over a pit by its own framing. The fire bars are carried under the Heater on two bars of ample length whose ends are embedded in the earth. The fire bars can be lifted out to give freedom of access to the Heater for cleaning purposes.

The portions of the three sides of the pit which are exposed to the fire are lined with fireclay slabs. The chimney is provided with two soot doors and is 15-ft. high.

The illustration shows a Keith Fan and connection from the fan to the heater.

CAPACITIES AND CODE WORDS OF TUBULAR HEATERS.

Taking air speed through heater at 2,000 feet per minute. Loss of head through heater about 0.6-in. W.G.

Temperature rise is about as follows :—

Entering Temperature 15° F.

„ „ 60° F.

„ „ 90° F.

Leaving Temperature 70° F.

„ „ 110° F.

„ „ 135° F.

Volume of Air in cubic feet per min.	Size of Heater.	Heater only, as page 7.	Heater with Fire Bars and Angle Irons, as page 5.	Heater with Fire Bars, etc. and 15-ft. Chimney and Connection to Smoke Box, as page 5.	Heater, Fire Bars, Chimney complete and Fireclay Slabs, as page 5.	Heater with Fire Bars and Doors for Brickwork, as shown on page 4.
4400	30	Exvek	Exzir	Eyets	Eymeg	Eysup
5800	40	Exvil	Exzos	Eyetz	Eymuk	Eytaal
7200	50	Exvom	Exzut	Eyfey	Eynul	Eytur
8800	60	Exvun	Eyagd	Eyfob	Eyojk	Eyuhk
10400	70	Exwak	Eyahf	Eyfuc	Eyolm	Eyuyl
11800	80	Exwel	Eyagj	Eygay	Eyonp	Eyuln
13400	90	Exwim	Eyalj	Eygib	Eyost	Eyump
14800	100	Exwon	Eyarn	Eygud	Eypik	Eyups
16400	110	Exwup	Eyasp	Eyhic	Eypol	Eyurt
17800	120	Exyam	Eyavs	Eyhuf	Eyraj	Eyven
19400	130	Exyen	Eycix	Eyjab	Eyrek	Eyzux
20900	140	Exyip	Eycoy	Eyjec	Eyrun	Ezajk

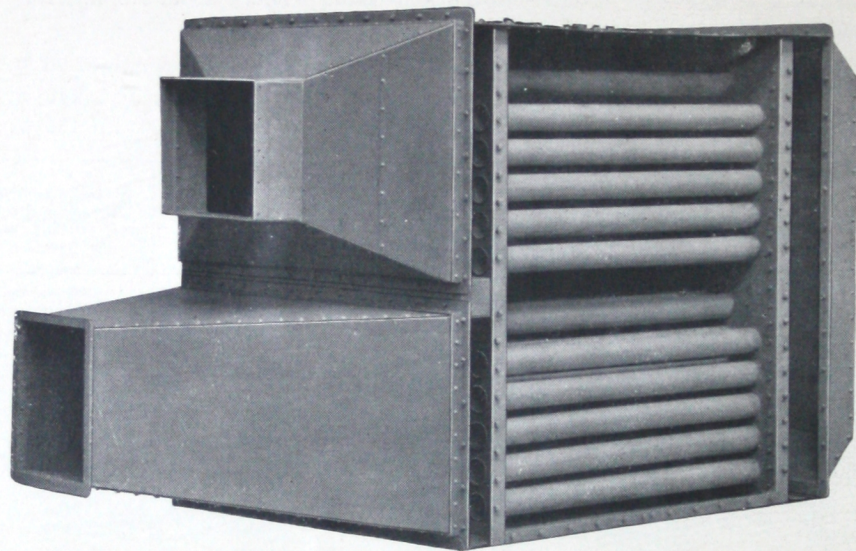
If the Heater is required complete with Fan and connection between Fan and Heater, blow-through type, add Code Word : Ezawx.

If Oil Engine is required, add Code Words :—Petrol, Xucfi ; Paraffin, Xucge ; Crude Oil, Xucha.

Unless otherwise stated the Fan required will be taken to be for belt drive. When electric drive is required particulars of current available should be sent.

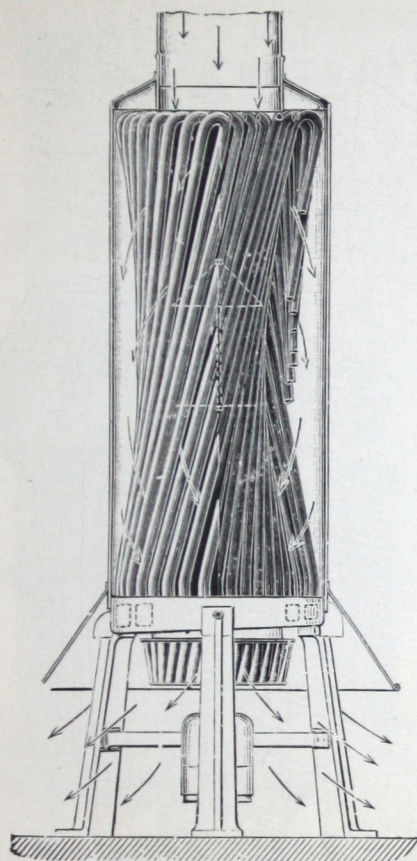
Any additional resistances to air-flow that the Fan is required to overcome should be stated, free air at inlet and outlet of Fan and Heater will otherwise be assumed.

Tubular Heater—*continued*



The illustration shows two Blackman Tubular Heaters arranged in series, one above the other, as well as connections from and to the Heaters, a typical arrangement for the utilisation of the waste heat of flue gases.

For a pair of Heaters complete with connections, as illustrated above, add Code Word: Ezalm, to that for Heater only on page 6.



**Sectional View, showing direction
of air-flow.**

KEITH THERMO-VENTILATORS.

With 5-ft. steam tubes having $1\frac{1}{2}$ -in. steam inlet and 1-in. outlet, 15-in. Open Type Keith Fan and Electric Motor, and Steel Plate Mantle having 18-in. spigot at top.

Capacity.—2,000 cub. feet of air per minute raised from 60°F. to 135°F. with steam at 50-lbs. pressure and Fan running at 1,120 revolutions, and taking 0.4 H.P. Steam consumption about 180-lbs. per hour.

Direct Current,
up to 500 volts.

D24 Semi-enclosed Motor, with B10 Starting Rheostat.

Alternating Current,
3-phase, 50 periods,
up to 500 volts.

A19 Semi-enclosed Motor with 3-pole Starting Switch.

Code Word : Ezbiz

When ordering, please state details of electric current and pressure of steam available.

Approximate Shipping Specification :—

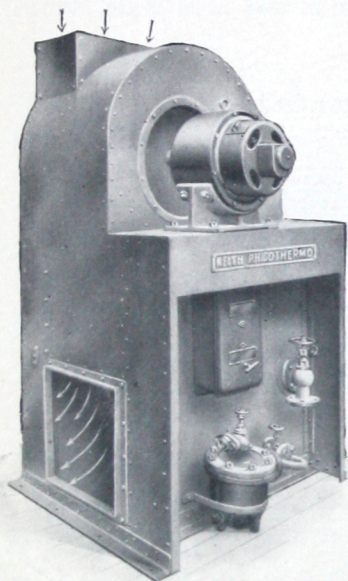
900-lbs. net.

1,120-lbs. gross.

60 cubic feet.

KEITH RHIGOTHERMO SHIP VENTILATING BATTERIES.

The air is delivered at about 1-in. water gauge pressure, and heated about 65°F above its entering temperature.



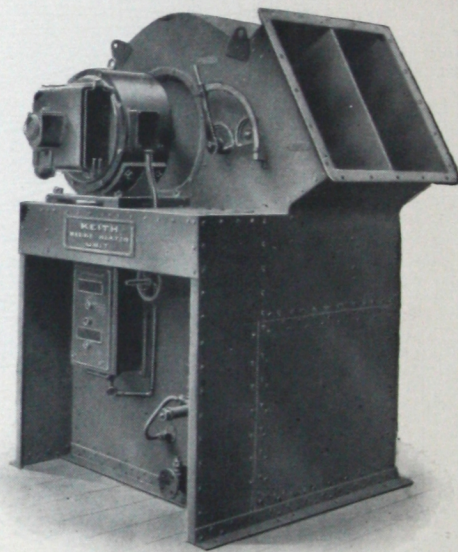
NON-REVERSING TYPE

Size	Volume of Air in Cubic Feet per Min.	Shipping Specifications (Approximate)		
		Net Cwts.	Gross Cwts.	Cubic Feet.
0	2000	11	13	85
1	3000	13	16	104
2	4500	20	24	170
3	6000	26	32	230

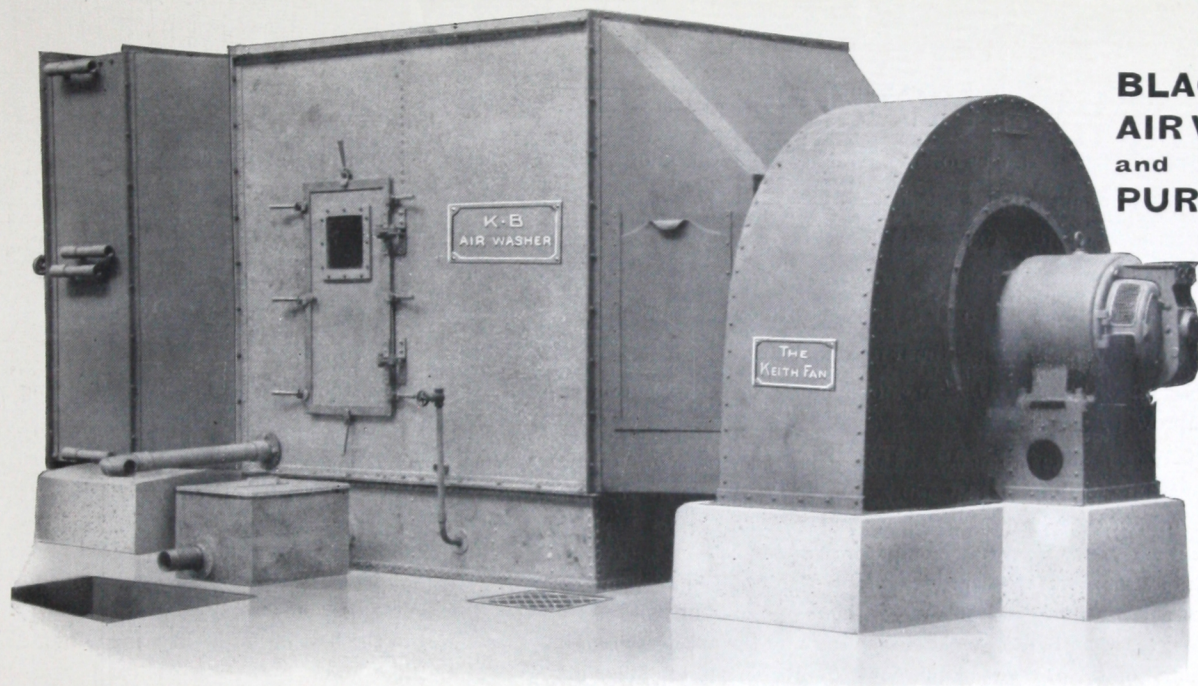
CODE WORDS.

Size	0	1	2	3
Non-reversing	Ezcay	Ezcez	Ezcib	Ezcoc
Reversing	Ezcud	Ezdaz	Ezdeb	Ezdic

When ordering, please give details of electric current and steam pressure available.



REVERSING TYPE



BLACKMAN AIR WASHERS and PURIFIERS

for particulars
of Connections
between
Washer & Fan,
see page 1.

BLACKMAN WASHER WITH A KEITH FAN.

Capacity in Cub. Ft. per min.	Pump Capacity. Galls. per min.	Washer Code Word.	Capacity in Cub. Ft. per min.	Pump Capacity. Galls. per min.	Washer Code Word.	Capacity in Cub. Ft. per min.	Pump Capacity Galls. per min.	Washer Code Word.	Capacity in Cub. Ft. per min.	Pump Capacity Galls. per min.	Washer Code Word.
4000	18	Ezeyb	13500	60	Ezfof	27000	125	Ezgif	47000	220	Ezhef
5400	25	Ezfab	16000	75	Ezfug	32000	150	Ezgog	52000	240	Ezbig
7200	36	Ezfec	18500	85	Ezgac	36000	170	Ezguh	56000	270	Ezhoh
10000	45	Ezfid	24000	110	Ezged	40000	190	Ezhad			

The current available for the motor of the pump should follow the code word for the washer, otherwise a belt-driven pump will be included.

CONDITIONS OF SALE.

OUR CONDITIONS OF SALE are as follows, and any modification of the same requires our consent in writing :—

PRICES are subject to revision without previous notice.

TERMS OF PAYMENT according to special arrangements.

TIME OF DELIVERY is adhered to as far as possible. Any delay does not give the right to cancel the order, or to claim damages.

CANCELLATION OF ORDERS can only take place with our consent, and on conditions which compensate us for any loss.

WEIGHTS are approximate and given without responsibility.

ILLUSTRATIONS IN CATALOGUES are not binding for the execution of orders, as the construction of the apparatus is being continually improved

GUARANTEES.—We guarantee to repair without charge all parts of our goods which, within one year from day of despatch (or within six months if they are in continuous use, day and night), are proved to have given way owing to faulty material or workmanship, or at our option to supply replace parts free. The useless or damaged parts become our property and have to be returned to our Works free of any forwarding charges and without being altered in any way. We reserve the right to make repairs on the spot if we consider it advisable to do so. We do not pay for repairs made without our permission, and refuse all responsibility for goods repaired without our consent and advice. This guarantee does not apply to ordinary wear and tear. We give, when requested, advice concerning the application of our specialities to the best of our ability and without charge, and cannot on the other hand guarantee results beyond the following :—

We guarantee the capacities stated by us by agreeing to the return of any apparatus proved to fall short of our figures by more than a tolerance margin of 5%. For all goods supplied by us, but not made at our Works, our guarantees do not extend beyond those given to us by the makers. Our guarantees are given only on condition that the apparatus are properly fitted up, and that they receive proper treatment. It is distinctly understood that we do not accept any responsibility for direct or indirect damage other than above stated. A counterclaim does not entitle the customer to defer payment.

NEW ACCOUNTS.—Cash or references should be sent with orders.